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# Psychoeducational Assessment from a Transactional Perspective

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Psychological assessment takes place within a logical context that is at least conceptual, and ideally theoretical, whether or not that conceptual context is explicit and well understood by practitioners. Psychological assessment that is done for educational purposes, that is, psychoeducational assessment, is undertaken in a special context: the effort to construct effective programs of education based upon individual characteristics and needs of students. On the assumption that the ability to profit from school experience varies as a function of individual differences in intelligence, school and educational psychologists and educators have traditionally spent the largest portion of their assessment time assessing ability. Unfortunately, such persons often are not operating on the basis of explicitly stated concepts of the nature and development of ability, or of what latent variables underlie individual differences in school achievement. Thus, practitioners may set out to assess individual differences in ability without actually understanding what they themselves believe to be the nature, modes of development, and various manifestations of the very ability that they seek to assess!

It is highly desirable, if not essential, that practitioners of the art of psychoeducational assessment, and certainly developers of the instruments of such assessment, hold, and be aware of, explicit, systematic concepts of the nature and development of intelligence, including ontogenesis, variety of manifestations, development of individual differences, susceptibility to modification, interaction with "nonintellective" variables, and correlation with important criterion variables. Further, it is especially desirable that theoretical understanding precede the development of assessment instruments, because such instruments should reflect consistent notions of the nature of what they are supposed to assess, that is, the latent variable. In accordance with this view, the goal of this chapter is to present one particular view, a transactional one, of the nature and development of human ability, and to suggest that such a view leads more logically to some psychoeducational assessment practices than to others. In doing so, we examine first some of the basic characteristics and problems of psychoeducational assessment, especially of individual differences in intelligence, then present our approach to the nature and acquisition of logical thought, and finally discuss particular assessment procedures that are conceptually consistent with that theoretical approach.





## Nature and Problems of Psychoeducational Assessment

Psychologists agree generally that psychoeducational assessment has at least the following goals (Haywood, 1984; see also Utley, Haywood, & Masters, Chapter 19 in this volume):

1. to classify schoolchildren according to their aptitude for school learning;
2. to assist in grouping children by aptitude, the notion being that differential pedagogical techniques will be used for the different groups so formed;
3. to identify individual need for educational remediation in specific domains;
4. to construct prescriptive programs of education, either individually or for classified groups.

According to Haywood, Brown, and Wingenfeld (1990), these admirable goals, unfortunately for the children, have most often been collapsed into a primary emphasis on the first, classification. Classification itself has multiple goals, including group planning for the use of available resources in school systems and individualized educational programming. Classification in education is pursued for the same reasons as diagnosis in the health and mental health fields: the notion that effective treatments are known, are more-or-less automatically related to diagnoses, and will be implemented in cases of all persons who fit a particular diagnostic category. The corresponding pedagogical notion is that effective education can be achieved to the extent that instruction is "pitched" at just the right level for each child, i.e., if the level of difficulty is not too far above or below each child's learning aptitude. Three broad tracks have emerged from this approach: specialized instruction for exceptionally talented or "gifted" students, regular classes for the majority of students whose general learning aptitude is within two standard deviations of the population mean, and specialized instructional services for children who have low learning aptitude scores, as in the case of mentally retarded children, or quite special needs, such as children with impaired hearing or vision or with specific learning disabilities (Haywood, 1984). There are significant problems with the use of normative, standardized tests for these purposes, even when all of the purposes are pursued. The following discussion of these problems is borrowed heavily from Haywood (1984) and Haywood, Brown, and Wingenfeld (1990).

Whatever their predictive validity in a group or correlational sense (which might be differential with respect to ethnic group membership), standardized and normative tests have less success when applied to prediction in individual cases. This may be especially true when the scores of individual children in minority ethnic groups are compared with norms derived from samples of the majority population (Elliott, 1988; Gregory & Lee, 1986; see also Jensen, 1980, for a contrary view).

It is not merely a question of making certain that minority groups are proportionally represented in normative samples; indeed, the situation is inherently inappropriate even when the normative samples of the tests contain subjects from different ethnic groups in exact proportion to their numbers in the population. Haywood (1984) observed that

> It is scant comfort that the score of a black child is compared with that of the "average" child of comparable age in the normative sample, when that "average" child is a statistical abstraction made up of 80% white children, 11% black children, and some smaller percentages of children from other ethnic groups. One might observe that such a comparison is 11% correct in the case of a black child, and never more than 80% correct in the case of a white child. (p. 2)

The point is not one of differential effectiveness by ethnic group with respect to the tests' predictive (classificatory) validity when group comparisons are being made. The problem is not so much with the tests themselves (see discussion by Utley, Haywood, & Masters, Chapter 19 in this volume), because they do not appear to show predictable biases or differential predictability. The use of the tests in a normative way, that is, to compare the performance of individual children with that of the average performance of similar children in a normative sample, is the problem. Even though group data fail to reveal lower predictive validity for children who are like the smallest proportion of the normative sample, these "normative" comparisons are still inherently inappropriate because establishing children's rank order with respect to a normative sample is not very helpful either in estimating what those children can do or in constructing educational programs for them.

Assessment based primarily on normative tests and used primarily for classification may lead to misclassification that is not distributed equally over population subgroups (see, for example, Mercer, 1970, 1973, 1975). The direction of misclassification about which people are most concerned is placement in special education. Such misclassification is the joint product of test error, of overreliance on test data in the assessment process, and of the fact that variables other than intelligence itself may influence the learning and school performance of children; i.e., intelligence as a predictor of school performance is only one of several relevant predictors, albeit a major one. Even if the effects of individual differences in intelligence were distributed uniformly, the other predictors (e.g., individual differences in intrinsic motivation; Haywood & Switzky, 1986a) may exert



differential influence depending upon the subcultural experiences of the children.

Another problem is that most standardized, normative tests, being used primarily for classification, are not prescriptive. Being derived from a "static" testing situation (one in which children are expected to answer questions and solve problems without help), scores on these tests contain little information about performance in a criterion situation, that is, one in which there actually is teaching. Knowing that a child lacks certain information or takes too long to solve a particular problem tells one little about how to teach the child to perform more adequately in that domain of functioning, or about why such deficiencies exist.

The notion that proper classification leads to proper treatment has not been broadly supported in the educational realm, especially with respect to the placement of children in special classes for educable mentally retarded children (Hobbs, 1974). Even when children have been "correctly" classified according to psychometric criteria, the promise of enhanced opportunities to learn is often not fulfilled (Dunn, 1968; Lilly, 1982). This statement simply calls attention to the critical difference between "need for special services" and "probability of deriving benefit from special services." In the case of most children who make low scores on standardized normative ability tests, the need for special services is apparent. The probability that they will benefit from special services depends upon the extent to which such services have been constructed on the basis of diagnostic and prescriptive information that is relevant to criterion (classroom learning) situations. In such situations, the problem may reside less in the predictor than in the criterion!

Another problem is that most standardized normative tests of ability do not reflect contemporary knowledge of cognitive and intellectual development and thus are based on outmoded models of the nature and development of ability factors (Haywood et al., 1990). The knowledge base has exploded in the last 20 years. Assuming an average lag of 20 years in the transition from theory/knowledge gains to their applications in practice, as Gallagher (1983) and Glaser (1976) have suggested, the earliest advances in this knowledge explosion are just now being reflected in the newest tests. Current concepts of the nature and development of ability (e.g., Gardner, 1983; Haywood & Switzky, in press; Horn, 1972; Sternberg, 1985) and of the relation between intellectual aptitude and other variables, must be taken into account in the construction of assessment procedures and instruments (Haywood & Switzky, 1986a).

Together with new knowledge has come a new set of assessment questions, demanding new approaches to finding the answers. Traditional normative tests are based principally on assessment of achievement (Anastasi, 1987; Reschly, 1981). These tests lead one to ask and answer such questions as how much a subject has learned, assuming equal opportunities to learn, and what kinds of things that person cannot do well.

Given contemporary knowledge of intellective and cognitive development, it is now possible to ask process questions: how persons go about defining, analyzing, and solving problems, what specific processes of thought appear to be working well, which ones are less adequately developed. More radically different, and even more important, questions concern how much investment an examiner has to make in order to stimulate a higher level of performance, and the nature of subjects' response to teaching of generalizable principles and strategies (e.g., Feuerstein, Rand, & Hoffman, 1979; Haywood, 1988; Haywood et al., 1990). By addressing these questions, examiners change the focus from children to precesses, environments, and strategies. One asks what processes must be taught and learned, what environmental conditions must exist, and how strategies must be changed, in order to produce an acceptable level of learning and performance. Such questions are in sharp contrast to the more traditional question of what persons who take tests *are*, and they require quite different assessment strategies.

Use of standardized normative tests may lead to self-fulfilling prophecies: children get low scores on predictive tests, these scores go to their teachers, and the children are taught at the level of the scores rather than being held to a higher potential level of learning. Because they are taught at a low level, they achieve at a comparably low level, thus completing the self-fulfilling prophecy (Brophy & Good, 1970; Cooper & Good, 1983). Even though there is controversy associated with the research on "Pygmalion" effects (e.g., Kellaghan, Madaus, & Airasian, 1982; Pelligrini, & Hicks, 1972; Raudenbush, 1984; Thorndike, 1968), the fundamental phenomena have been demonstrated repeatedly (e.g., Rosenthal, 1974; Rosenthal & Babad, 1985; Rosenthal, Baratz, & Hall, 1974; Rosenthal & Jacobson, 1968; Rosenthal & Rubin, 1971; Weinstein, Marshall, Sharp, & Botkin, 1987).

Failure-following-the-test may be paralleled by failure-within-the-test, leading to similar results over the short range. Many standardized normative tests of intelligence use a "ceiling item" procedure of administration, in which examiner and subject may leave a particular subtest only after a prescribed number of consecutive failures. The effect of this may be twofold: (a) successive item failures leave children with the notion that they are incapable of getting correct answers, so their enthusiasm for academic-like tasks decreases; and (b) motivation within the test is impaired, because each new subtest is begun with the taste of failure left over from the end of the preceding subtest. As a result, children may not approach assessment tasks enthusiastically or confidently.

Standardized normative ability tests do not do a poor job; they simply may not do the job that needs to be done. They do an excellent job of what they were designed to do, that is, to predict subsequent school achievement and to classify children according to those predictions. Those goals are no longer the most appropriate ones. We now have the



ability to ask more sophisticated questions, such as: "What specific deficiencies or strengths in thinking processes are revealed by this performance?"; "Is there a simple explanation for any apparent deficiencies in ability, such as lack of essential information?" (i.e., a distinction between ignorance and inability); "What level of performance would be possible under optimal conditions, and what conditions must exist in order to produce that level of performance?" (Haywood et al., 1990). These are more challenging questions, questions of a transactional nature, and they require new goals as well as new techniques of assessment (Feuerstein et al., 1979; Haywood & Switzky, 1986b, 1986c). Some of these are discussed in later sections of the chapter.

## A Transactional View of the Nature and Development of Ability and Thinking

The transactional perspective can be summarized as a list of assumptions about the nature of intelligence and its development, the nature of cognitive processes, comparison of these two constructs, the role of motivational and affective variables in the development of each, and the modifiability of intelligence and cognition. The following statements constitute the core of the transactional perspective. Following discussion of these, we take up the essential question of what gives this point of view its transactional character.

1. Intelligence is multifaceted.
2. Intelligence is multidetermined.
3. Individual differences in intelligence are understood well according to a polygenic model.
4. There are biologically determined trajectories of individual development to which each person seeks to adhere and to return.
5. Intelligence, understood as "native ability," is not sufficient to explain individual differences in effective thought, perception, learning, problem solving, and social interaction.
6. Whatever one's individual level of intelligence, certain more-or-less-formal modes of thinking, perceiving, learning, and problem solving must be acquired in order for subsequent effective thinking and learning, across a wide range of content and contexts, to occur.
7. The application of intelligence never occurs in any person at 100% of that person's capacity or potential.
8. The application of intelligence to thinking, perceiving, learning, problem solving, and social interaction can always be improved.
9. The development of modes of formal thought depends to some extent on conditions of motivation, especially "intrinsic" motivation, as well as on other affective and attitudinal states.

10. Intelligence is modifiable only modestly and with great investment, but cognitive processes are readily modifiable and their modification produces changes in performance.

## *Intelligence is Multifaceted*

The multifaceted nature of intelligence refers to two phenomena. The first is the repeated finding of "structuralists" in psychometric research that there are several "clusters" of abilities, representing general, group, and specific factors (Horn, 1972; Kaufman, 1975; McCall, Hogarty, & Hurlburt, 1972; Meyers & Dingman, 1966; Meyers, Dingman, Orpet, Sitkei, & Watts, 1964; Stott & Ball, 1965). The second is the correlated clinical observation that persons seldom if ever present "flat" profiles of ability across different kinds of tasks—i.e., different kinds of ability seem to be required to comprehend and acquire proficiency in different kinds of performance (such as using words, understanding social relations, solving math problems, perceiving spatial relations, and making sense of seemingly ambiguous stimuli). If groups of persons are rank-ordered on one aspect of intellectual functioning, e.g., vocabulary, it is quite unlikely that they will retain the same ranks on a second aspect, e.g., block design or map reading or coding. This is not to deny the existence, at some level, of the "g" factor, or general intelligence. It is clear that to the extent that one has very high global intelligence one is more likely than are those with low global intelligence to be able to do all of these things well (see, e.g., Jensen, 1984, 1987). It is nevertheless useful to emphasize the intraindividual variability in intellectual *pattern* rather than some notion of intraindividual homogeneity. Gardner (1983) has focused attention most sharply on the differences, rather than the similarities, among the kinds of ability required to learn and perform different qualities of tasks such as doing mathematical operations, using words to create images, playing musical instruments, manipulating objects in space in an orderly manner, and understanding analogies. In a developmental sense, different types of ability appear to become increasingly differentiated with increasing age of children (e.g., Harwood & Naylor, 1971; Lienert & Croth, 1964; Nesselrode, Schaie, & Baltes, 1972). Guilford's structure of intellect model (Guilford, 1967; Guilford & Hoepfner, 1971) has relied most heavily upon, and in return given support to, a multidimensional view of the nature of intelligence.

## *Intelligence is Multidetermined*

The multidetermined nature of intelligence is by now axiomatic, even to those who choose to emphasize one or another source. Switzky and Haywood (1984) have discussed four models of the development of intelligence: the genetic model, the environmental model, the genetic-environmental interaction model, and the transactional model. The two main effects (genetic and environmental) models were shown to rest on some valid observations but to be both conceptually and empirically inadequate to incorporate what is known about individual differences in intelligence. The interaction model incorporates more of the existing data, but is also inadequate. The most promising model was shown to be a transactional one, in which individual differences in intellectual development and expression are seen to be products of genetic endowment engaged in a series of "transactions" with environmental circumstances, and with a person-characteristic trajectory of development for each individual. Deviations from personal trajectories may be brought about by disease, injuries, and extreme deprivation of learning opportunities, but there are "self-righting tendencies" that make it possible, and not always difficult, to return individual development to its genetically determined trajectory (Waddington, 1957, 1962, 1966). According to this transactional model, then, any person's intellectual level at any moment is a product of that person's (genetically determined) personal developmental trajectory, presence of absence of extreme environmental events, and availability of learning opportunities and social-ecological supports (Sameroff & Chandler, 1975). More detailed discussions of this general point of view, with different emphases, have been presented by Haywood and Switzky (1986b), McCall (1981), Sameroff and Chandler (1975), Switzky and Haywood (1984), and Waddington (1957, 1962, 1966).



## *Polygenic Determination*

The prevailing (but clearly not exclusive) view is that the development of intelligence is understood well according to a polygenic model. According to this concept (see, e.g., Gillespie & Turelli, 1989; McAskie & Clarke, 1976; Paul, 1980; Scarr, 1981; Scarr & Weinberg, 1983), individual differences in intelligence are the result of the action of several genes, none of which individually and solely determines the gross phenotypic variable of 'intelligence." In fact, each of several genes may be associated with the possibility of a different level of intelligence. Each person carries genes representing a limited portion of the complete range of intellectual possibilities. Thus, the different offspring of the same couple will have different intelligence levels sampled grossly from the same broad range. Because intelligence is not a single-gene trait (Bouchard & McGue, 1981), its different genetic determinants may be differentially affected by environmental change. In fact, Rice, Cloninger, and Reich (1980) presented a model of familial resemblance in ability that allows for polygenic inheritance, "cultural transmission," assortative mating, effects of common environments, and parental effects. This model is not only polygenic, it is quite consistent with a transactional view of the nature and development of individual differences in ability. Zigler and Hodapp (1986)

have provided an easy-to-understand explanation and illustration of the polygenic model.

## *Intelligence is Not Sufficient*

Haywood (1989) has distinguished sharply between intelligence and cognitive processes. He has maintained that the question of whether or not, or to what extent, intelligence is modifiable by experience is a less important question than its history of debate and research would suggest, precisely because intelligence alone is never sufficient to understand individual differences in criterion variables: effectiveness and efficiency of thinking, learning, problem solving, and gathering and applying knowledge. Intelligence is seen as largely genetically determined, difficult to modify substantially, and relating primarily to the relative ease with which persons acquire formal processes of thinking. This distinction is similar in some respects to that between "fluid" and "crystallized" intelligence (Cattell, 1980; Cattell & Horn, 1978; Hakstian & Cattell, 1978; Horn, 1980; Horn & Cattell, 1982), and even to notions of "practical" intelligence (Sternberg & Wagner, 1986; Wagner & Sternberg, 1985). The essence of the distinction is that, however many (or few) IQ points one has, it is still necessary to develop durable and generalizable modes of thinking (the "cognitive structures" that Piaget explored) in order to apply effectively the intelligence that one has. According to Haywood and Switzky (1986a), good environments do not create intelligence, but they have the potential to support the acquisition of essential cognitive processes. Further, "bad" environments do not destroy intelligence (unless they destroy a large number of brain cells), but they may function so as to block access to one's intelligence and render it "unavailable" for application to learning and problem-solving situations. The kinds of formal cognitive processes that must be acquired through experience include the cognitive "structures" that the Piagetians refer to (e.g., Piaget, 1970, 1985), as well as more sharply focused strategies for thinking in more specific situations.

## *Acquisition of Cognitive Processes*

According to this distinction, both children who are high in genetic intelligence and those who are quite low must acquire certain cognitive processes in order to be effective in academic and social learning. Feuerstein and Rand (1974; Feuerstein, Rand, Hoffman, & Miller, 1980) have made a further distinction between the mechanisms by which children acquire such basic thinking modes: "direct exposure," and "mediated learning experience." It seems clear that children who are genetically predisposed to have a high level of intelligence will acquire relatively more of their essential cognitive processes through direct exposure, that is, through



successive interactions with environmental events. Children who are genetically predisposed to have a low level of intelligence will require relatively more mediated learning (through the intervention of adults or other more cognitively competent persons), that is, will need more help, in order to acquire their basic cognitive processes. Haywood's (1989) distinction is summarized in Table 2.1.

According to this comparison, intelligence is largely genetically determined, whereas cognitive processes must be acquired. Intelligence is modestly modifiable, but cognitive processes are highly modifiable (having been acquired through learning in the first place). Components of intelligence include general, group, and specific factors—all related to "pure" ability variables, but components of cognitive processes may include both cognitive "structures" and motivational/attitudinal/affective variables. The principal role of parents in the development of intelligence is to contribute genes, nutrition, safety, and a supportive environment, whereas the role of parents in the acquisition of cognitive processes is to provide "mediated learning experiences" (see Arbitman-Smith, Haywood, & Bransford, 1984; Feuerstein et al., 1979; Haywood, 1987). According to this transactional perspective, intelligence is an outmoded and inadequate concept and should be replaced by more specific concepts such as focused cognitive processes.

## *Modifiability*

In addition to strong evidence for very substantial genetic determination, there is also strong evidence for the possibility of modifications brought about by experience (see, e.g., Haywood, 1967; Haywood & Switzky, in press; Haywood & Tapp, 1966; Hunt, 1961, 1979; Kamin, 1974; Uzgiris,

TABLE 2.1. Comparison of intelligence and cognitive processes.

| Dimension | Intelligence | Cognitive processes |
|---|---|---|
| Source | Largely genetic | Must be taught/learned |
| Modifiability | Modest, with great effort | High, with teaching |
| Character | Both global and specific; equals ability to learn | Generalized across content domains |
| Assessment | Achievement; products of past learning | Process assessment; learning in teaching situations; dynamic |
| Composition | Intellectual aptitudes (verbal, spatial, memory, quantitative, etc.) | Mix of "native" ability, work habits, attitudes, motives, strategies |
| Parents' role | Genes, nutrition, health, safety | Mediated learning; active, directed teaching |

*Note.* From "Multidimensional Treatment of Mental Retardation" by H. C. Haywood, 1989, *Psychology in Mental Retardation and Developmental Disabilities* (Division 33, American Psychological Association), *15*(1), pp. 1–10. Copyright 1989 by American Psychological Association. Reprinted by permission.

1970). The question of what it is that is modified by experience remains open; i.e., is it intelligence ("native" ability) or is it cognitive processes (acquired modes of thinking) that one can change by educational programs, environmental deprivation, or environmental support? We know that well-conceived and studiously applied programs of early education can result in significant, if sometimes temporary, IQ increases, and that "graduates" of such programs do better than do their uninstructed counterparts in quite long-range criteria such as staying in school through high school, not being retained in grade, and avoiding special education placement (Royce, Lazar, & Darlington, 1983; Schweinhart & Weikart 1988). Because IQ gains do tend to disappear (usually not by going back down, but by having untreated children catch up), it seems reasonable to assume that what has been changed is not intelligence but the children's access to their intelligence and their ability to apply it. In other words, they have acquired a more effective set of fundamental cognitive processes than have "control" children, and they use those effective thinking modes in both academic and social learning. Thus, it should be possible to bring about durable improvement in children's learning and performance effectiveness without necessarily changing their "intelligence."

## *Everybody Needs Intellectual "Tuning"*

The most common observation in clinical practice is that a given client is "functioning below potential." Reviewing psychological diagnostic reports in a psychiatric hospital, Haywood (unpublished) found that in over 70% of the cases the psychologists had concluded that the patients' intelligence had been underestimated by individually administered standardized intelligence tests! About 60 years age, Vygotsky (1929, 1962, 1978; see also Guthke & Wingenfeld, Chapter 3 in this volume) observed that persons are usually functioning below their intellectual potential and devised a method of estimating the potential intelligence as well as the relative degree of underfunctioning at a given time. He would typically give a test in the standard way (without help) and call the result "performance." He then would help the subjects to learn thinking and problem solving processes required for solving the kinds of problems represented in the test. Finally, he would give a "posttest" in order to determine to what extent the subjects had learned the principles and generalized them to the solution of further problems that required the same kinds of thought processes. Rey (e.g., 1934, 1962) used similar approaches to try to quantify and establish evidence for the discrepancy between performance and potential that clinicians were always suspecting. These early clinical efforts led to the Lerntest movement in Germany (Guthke & Wingenfeld, Chatper 3 in this volume), to the elaboration of Rey's work at Geneva, and to Feuerstein's elaboration of dynamic assessment in his Learning Potential Assessment Device. In the context of a transactional perspective on the nature and development of ability, the relevant implication is that intelligent and effective behavior requires native ability, but it also requires access to one's intelligence as well as systematic modes of generating, selecting, applying, and evaluating thinking, learning, and problem solving strategies. It is the relative availability and application of such strategies that constitute individual differences in the magnitude of the difference between performance and potential, and it is that area (Vygotsky's "zone of proximal development") that is eminently modifiable.



## *Cognition and Motivation*

To paraphrase Julius Caesar, *Omnia conscientia divisi est in partes tres*. According to the philosophical forefathers of contemporary psychology (Boring, 1950), the three divisions of consciousness were said to be cognition, conation, and volition. Translating "cognition" into "intelligence," we have traditionally made a sharp separation between intellective and affective (conative) variables—while denying volition altogether, thanks to the combined influences of Sigmund Freud and John B. Watson! In making tests, psychologists have been careful to remove consideration of motives, attitudes, and feelings from assessment of intelligence. At the same time, we have certainly been aware that individual differences in performance effectiveness and efficiency are often observed to be the interactive products of both intellective and such "nonintellective" variables. Our position is that processes of thinking, learning, and problem solving develop in transactional relation with motivation, especially "task-intrinsic" motivation, attitudes about learning and thinking, self-concept variables, and habits of working, thinking, and learning (see Tzuriel, 1990). Haywood and Burke (1977) suggested a "motivational theory of cognition" in which there is a reciprocal relation between ability variables and intrinsic motivation. Contrasting children who are genetically predisposed to high ability with those of low genetic potential, they observed the following:

> The early attempts at exploration of relatively competent children meet with proportionately higher rates of success (pleasure) than the exploratory attempts of relatively incompetent children. In the first weeks after birth, normally developing children greet stimulus change with an orienting reflex, the relatively vigorous feedback from which is experienced as pleasurable mild arousal. Other children may be relatively unresponsive and may not exhibit the orienting reflex to the same levels of stimulation that were effective with normally developing children, or . . . may not experience sensory feedback from it. Thus, from the very outset, some children are experientially deprived relative to the experience of normally developing children [and] . . . may require more repetitions of stimulus events in order to form perceptual-cognitive schemata . . . These children then have increasing difficulty assimilating new information, since the initial store of cognitive

structures is limited. To the extent that cognitive structures (schemata) are unavailable for the assimilation of new information, accommodation must occur, and radical accommodation . . . may lead to an unacceptably aversive level of arousal. Thus, novelty may come to be avoided systematically, and the initial disadvantage of relatively incompetent children is compounded many times by this succession of experiences. . . . One child may try unsuccessfully to explore and to gain mastery, and that failure is experienced as punishment. Another child tries to gain behavioral competence and meets with intermittent success, and that success is reinforcing. Increasingly, the second child gets the idea that there is some degree of satisfaction in taking in new information, in exploring the environment, in taking limited risks, in undertaking tasks, and in achieving some mastery. . . . Failing to find satisfaction in novelty and in task-related events, the child whose initial attempts at exploration and mastery have been frustrated may stop seeking satisfaction and withdraw into a pattern of seeking only to avoid disappointment by concentrating his attention upon nontask aspects of the environment . . . The child who has learned the rewards of engagement with novelty and with tasks becomes a predominantly intrinsically motivated child who is, relative to his general ability, efficient at learning and performance. The child who has failed to find satisfaction in novelty and in task orientation becomes an extrinsically motivated child and is, relative to his general ability, inefficient at learning and performance. (pp. 257–258)

According to this kind of analysis, the trait of intrinsic motivation develops in part as a consequence of the relation between environmental challenges and one's abilities to meet those challenges, but cognitive structures are acquired also in part as a function of changes in intrinsic motivation. There is strong evidence (e.g., Haywood & Switzky, 1986a) for at least an interactive relation, and perhaps for a transactional one, between these "intellective" and "nonintellective" variables—such consistent relations that it would seem inappropriate to continue to ignore the "conative" variables in the assessment of individual differences in "cognitive" variables. Tzuriel, Samuels, and Feuerstein (1987) have begun to specify the role of such variables in dynamic assessment. The relations among nonintellective factors and deficient cognitive functions, type and amount of mediation, and objective scores have been investigated recently on four clinical groups using a dynamic assessment approach (Samuels, Tzuriel, & Malloy-Miller, unpublished). A model of the relations among MLE processes, cognitive modifiability, and affective-motivational processes has been discussed by Tzuriel (1991). Basically, the affective-motivational factors are thought of as an essential substrate for the proposed relation between the components of MLE and cognitive modifiability. The transactional nature of the relationship is characterized by the reciprocal effects of all components (factors) and by the complex circular process. Whereas in interaction one factor (A) has an effect on a second factor (B), and vice versa, in transactional relations B, being changed or transformed by A, affects A in return in a different way than had the original B. For example, efficient mediation by parents can



facilitate affective-motivational processes which, in turn, encourage the mediators to adjust both the quality and the quantity of their mediation to match the child's responses (e.g., reduce efforts for child's engagement).

## What Makes This Approach Transactional?

There are several essentially "transactional" aspects of the general view of human ability presented here. The most important is the observation that *none* of the predisposing, precipitating, or consequent (criterion) variables is constant—a fact that makes the relations among them dynamic, constantly changing, and of a transactional character. Second, ability is seen as a series of *processes* that are constantly changing, that vary with respect to the nature of their own applications, and that respond to qualities from quite different domains of human functioning (that is, to cognitive processes, motivational traits and states, attitudes, habits, social histories). The following statements summarize the transactional nature of this view and its particular application to psychoeducational assessment.

1. If C is a joint product of A and B, then A and B *interact* in such a way that a different level and/or quality of C is produced by B for each of >1 qualities or levels of A, and/or vice versa. Such an interaction can be static in nature, i.e., time or sequence may not necessarily be critical to the interaction.
2. In order to be *transactional* rather than merely *interactive*, the relationship must be between/among variables that change over time, in such a way that the interactive relation of A and B to C changes in quality and/or level as changes occur in A, B, or C. Such changes may reflect development, or the effects of other variables.
3. The essence of a transactional view of the nature of ability is the notion of a *dynamic* (i.e., constantly changing) relationship between ability and environmental influences. This qualitatively unstable relationship is embodied in the notion of genetically determined "trajectories" of development, the "canalization" of certain important cognitive and affective components, and the differential effects of powerful environmental events upon development (Switzky & Haywood, 1984; Waddington, 1957, 1962, 1966), depending upon (a) the level of the established developmental trajectory, (b) the specific nature of the "powerful" events, and (c) the quality of the ("ordinary" or posttraumatic) environment (Sameroff & Chandler, 1975). All three sets of conditions exert their effects, but the effect of each is moderated, amplified, or rendered qualitatively different by the actions of the other two conditions. In psychoeducational assessment, the particularly relevant qualities of environments are circumstances that militate for or against the learning of specific generalizable modes

of perceiving, thinking, learning, and problem solving; i.e., specific cognitive functions that will be required both now and later to support the understanding and learning of a wide variety of both social and academic content.

4. Transactional interpretations of ability are addressed to *processes* rather than to states; therefore, *assessment* rather than *measurement* is the appropriate task.
5. A transactional approach to psychoeducational assessment implies a dynamic relationship among subject, assessor, materials, and tasks, such that each influences the others, including effects of subject variations on the behavior of examiners, and even subject and examiner influences on the meaning of tasks and materials. Added to the notion that what is to be assessed is processes rather than states or products, these dynamic relationships make assessment an extremely intricate enterprise. Such transactional enterprises can be understood as dynamic lattices in which the immediately prior value of each interacting variable affects the contemporary and next values of each of the other variables.
6. A transactional approach to assessment, then, is one that (a) is based upon a transactional view of the nature and development of human abilities and performance, (b) is able to reflect *processes*, e.g., thought processes, as well as changes in those processes under changing conditions of assessment; (c) incorporates deliberate change as an essential part of the assessment technique; (d) incorporates motivational and affective components of behavior.

## Different Assessment Approaches that are Compatible with a Transactional Model

### *Dynamic Assessment*

The philosophy, goals, methods, and interpretation of what has come to be called "dynamic" assessment follow quite naturally from a transactional perspective on the nature and development of ability. Dynamic (or "interactive" as we have called it in this book) assessment is characterized by: (a) an emphasis on the processes of perceiving, thinking, learning, and problem solving, as opposed to emphasis on the *products* or outcomes of these processes; (b) recognition of the constantly changing nature of the processes of logical thought; (c) belief in the modifiability of the fundamental processes of logical thought, and in the ability of persons to bring about such modification; (d) use of assessment methods in which some sort of teaching/helping is part of the testing, often in a test-teach-test sequence; (e) interpretation of the difference between unassisted performance and performance after teaching as indicative of



modifiability or potential development; (f) teaching/learning of generalizable cognitive processes; (g) attempts to specify obstacles to effective learning and performance; (h) attempts to specify conditions that will permit or encourage more effective performance; (i) distinction between performance and potential, or between ignorance and inability (Haywood et al., 1990). This approach is called "dynamic" (or interactive) both because of its emphasis on processes that are constantly changing and because it involves deliberate attempts to modify those processes.

The essence of interactive/dynamic assessment is its reliance on the strategy of producing change in order to describe otherwise unobservable events. In the case of psychoeducational assessment, one tries to infer "learning potential" or potential performance by creating and applying conditions that support more nearly optimal performance. For example, a subject may be given a set of matrix problems such as Raven's Standard Progressive Matrices, as a "pretest," in a usual, standard, static mode. The score from that administration suggests the subject's usual independent performance. Training may then be given in the principles, concepts, and strategies of thinking and problem solving that may be required for successful performance on such tasks. Records are kept of the kinds and amount of teaching or "mediation" (Feuerstein et al., 1979) given and such variables as spontaneous corrections. Posttests are then given to determine the extent to which the subject has learned and can generalize those principles, concepts, and strategies to the solution of new problems of the same kind. Four important kinds of information are derived from these procedures: (a) initial level, or "performance," i.e., without help; (b) kind and amount of help/teaching/mediation needed to produce improved performance; (c) response to mediation, i.e., postteaching performance; (d) identification of the specific deficient cognitive processes that have impeded adequate performance. This last inference is based on the notion that if one applies a solution and performance is then improved, the nature of the original problem must have been related to the solution. The most important outcome is specification of the conditions that will support improved performance (Haywood, 1988).

These general principles of dynamic/interactive assessment have been incorporated in several assessment traditions and specific approaches. The most fully developed of these is the Learning Potential Assessment Device (Feuerstein et al., 1979; Feuerstein, Haywood, Rand, Hoffman, & Jensen, 1986; see also Tzuriel & Haywood, Chapter 1 in this volume). Strongly related bodies of work include Lidz's Preschool Learning Assessment Device (Lidz, 1990; Lidz & Thomas, 1987), and several instruments specifically focused on dynamic assessment of young children, such as Children's Analogical Thinking Modifiability (Tzuriel & Klein, 1985, 1987), the Frame Test of Cognitive Modifiability (Tzuriel & Klein, 1986), and the Children's Inferential Thinking Modifiability test (Tzuriel, 1989; Tzuriel & Eran, 1990), and procedures developed by Mearig (1987).

In addition to these procedures that are conceptually closely related to the theories and methods of Feuerstein, there is a substantially different tradition of interactive assessment in other parts of the world. For a description and history of the Lerntest approach, see Chapter 3 by Guthke and Wingenfeld, this volume. Other methods, developed and used primarily for research rather than for clinical use, include the "graduated prompt" procedure of Brown, Campione, and their colleagues (Brown & Ferrara, 1985), and the coaching methods of Budoff and associates (e.g., Budoff & Friedman, 1964; Budoff, Meskin, & Harrison, 1971). See also the chapters in this volume by Tzuriel and Haywood (Chapter 1), Carlson and Wiedl (Chapter 6), Samuels, MacKenzie, and Fagan (Chapter 10), and Samuels, Lamb, and Oberholtzer (Chapter 11) for more detailed discussions of different dynamic assessment methods and their use with different populations of subjects.

Dynamic assessment is not the only approach that is consistent with a transactional perspective on ability. In fact, there are several quite complementary assessment strategies that can fit comfortably under this conceptual umbrella. Following are brief discussions of just two of these: neuropsychological assessment and curriculum-based assessment.

## *Neuropsychological Assessment*

The use of behavioral observations to make inferences about the integrity of the nervous system is called neuropsychological assessment (Deysach, 1986; Haywood, 1968; Reitan, 1962). Lewis and Sinnett (1987) observed that "These assessments allow the identification of patients whose cognitive deficits have been underestimated or overestimated by other diagnostic procedures and provide clinically relevant information about potential for and specific means to promote recovery" (p. 126). Haywood (1977) has observed that clinical neuropsychological assessment is different in important ways from standardized, normative assessment, and in many of those same ways is similar to dynamic assessment.

Neuropsychological assessment rests in part on the assumption that intelligence, although largely genetically determined, may not be accessible for a variety of reasons (especially because of injury or subfunctioning of some parts of the brain). Because of this assumption, neuropsychologists search for maximal performance rather than for typical performance; that is, they try to elicit each subject's best possible performance on a variety of tasks. Further, recognizing the multidimensionality and the complexity of ability, they use a substantial variety of diagnostic tasks rather than trying to base diagnostic inferences on "narrow-band" tests. Neuropsychologists recognize a discrepancy between performance and potential, so they search both for ways to define "potential" and for the conditions that will promote the realization of that potential. They are typically at least as interested in comparisons among different aspects



of functioning within persons as in comparisons of their subjects' performance with some normative standard. In making such within-subject comparisons, neuropsychologists frequently compare functions that are centrally mediated on different sides of the brain, for example, language functions with visual-spatial-perceptual functions, as well as sensory and motor functions (mediated in the posterior and anterior portions, respectively, of the cerebral hemispheres). Observing the changing nature of brain functions, they also compare performances in the same domains over time.

Although one of the major traditions in neuropsychology, the Halstead-Reitan approach (Reitan, 1962), is based upon use of "objective" data gathered in standardized ways and evaluated by comparison to normative standards (Lewis & Sinnett, 1987), another major tradition rests on the work of A. R. Luria (see, e.g., Christensen, 1975), who made extensive use of qualitative information and "tailored" his tests and his procedures to the individual characteristics, abilities, and requirements of his subjects (Lewis & Sinnett, 1987). Thus, at least in one of its major traditions, clinical neuropsychology shares a part of a transactional perspective as well as this aspect of dynamic assessment. In both of these traditions, clinical neuropsychologists search for the cognitive processes that their subjects employ in solving the test items rather than merely for correct (or incorrect) responses.

## *Curriculum-Based Assessment*

A somewhat newer approach in psychoeducational assessment is curriculum-based assessment (CBA; Deno, 1985; Fuchs & Fuchs, 1986; Fuchs, Fuchs, & Stecker, 1989), so named because the material that one assesses with CBA is the very content of a local school curriculum (Deno, 1987; Fuchs, 1987; Tucker, 1985). CBA is an outgrowth of dissatisfaction with the use of nationally standardized school achievement tests, which, although allowing for comparison of local students' performance with that of students in many other places, might not reflect what is actually taught in any particular classroom. Its primary objective is to "obtain a reliable and valid measure of student achievement" (Deno, 1987, p. 41), while providing data for frequent modification of goals and teaching methods. Deno (1987) defined CBA as "any approach that uses direct observation and recording of a student's performance in the local school curriculum as a basis for gathering information to make instructional decisions." It is in many ways a *formative* evaluation technology, in that its users take frequent samples of students' performance and use the data to make inferences about learning processes and to adjust teaching methods, rates, and contents.

Fuchs (1987) has outlined four steps in CBA. These are (a) identifying the long-range goal; (b) creating the pool of test items; (c) measuring

pupil performance; and (d) evaluating the data base. The first step, identifying the long-range goal, requires teachers/evaluators to define in quite concrete terms the performance standard that they expect of each student. The second step requires them to identify the precise body of content that is to be learned, and to sample that content for test items. The third, measuring pupil performance, repeated as often as two or more times per week, requires systematic sampling from the "goal-level material" (Fuchs, 1987, p. 42) and charting the scores. Evaluating the data base is the heart of the method: rates of learning and projected (goal-established) rates are compared so that teachers may do what is necessary to conform the students' rates of progress to the slope of the goal-established curve. By examining the concordance or discrepancy of the empirical and projected progress curves and relating data points to corresponding teaching/learning strategies, evaluators can make some inferences about learning processes. Special sections of *Exceptional Children* (Tucker, 1985, guest editor) and *Teaching Exceptional Children* (Deno, 1987) have been devoted to these methods, and they contain especially instructive papers.

Although it clearly has not been derived from a specifically transactional concept of human ability, CBA is in many important ways consistent with such a view, and is also consistent with the conceptual basis of dynamic assessment. Characteristics of CBA that seem consistent with a transactional view include (a) view of learning ability as modifiable; (b) assumption that performance does not necessarily equal potential; (c) emphasis on identification and modification of processes of learning; (d) comparison of individuals' performance with other samples of their own performance rather than with norms; (e) use of assessment as a basis for educational prescription and change; and (f) use of direct intervention as part of the assessment procedure. Indeed, dynamic assessment and CBA could be quite complementary. Dynamic assessment is focused upon the search for and modification of quite fundamental and generalizable cognitive processes, that is, processes of thinking that cut across a wide variety of content domains. Many cognitive psychologists question the utility of the concept of broadly generalizable basic cognitive processes, preferring instead the notion of relatively domain-specific or domain-relevant cognitive strategies. With its emphasis on specific academic content, CBA could be a very useful addition.

There are other assessment approaches whose use would be entirely consistent with a transactional perspective. These include "diagnostic classrooms" and "ecological assessment." Because the rest of this volume is devoted to interactive methods of psychological and psychoeducational assessment, these methods are not discussed here. The primary point of these examples is that a transactional view of human ability can lead one to specific assessment strategies.



## Summary

We have argued that psychoeducational assessment is done on the basis of either implicitly or explicitly held theories of the nature and development of human ability, that such theories should be made explicit, and that assessment methods and strategies should be clearly based on them. We have presented a brief discussion of a "transactional" perspective on the nature and development of human ability, and tried to show that such a view demands certain assessment strategies while not leading naturally to others.

The following were said to be characteristics of a transactional perspective on human ability: (a) it is multifaceted; (b) it is multidetermined; (c) intelligence is an inadequate concept; (d) cognitive processes are acquired, and therefore are modifiable; (e) there is always a difference between performance and potential; (f) ability has motivational, affective, and attitudinal components; and (g) the relation between ability and environmental influences on it is constantly changing.

"Dynamic" or "interactive" approaches to assessment have been shown to be consistent with such a transactional perspective, as have neuropsychological and curriculum-based assessment. Assessment that is based on a transactional perspective must (a) be addressed to processes; (b) use intervention as an assessment strategy; (c) make use of a dynamic relationship among subject, assessor, materials, and tasks; (d) incorporate motivational and affective aspects of behavior as part of ability; and (e) identify the necessary and suffidient conditions for modifiability of the cognitive processes that one is assessing.

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